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# Railways Terminating in London.

SAMUEL REA.

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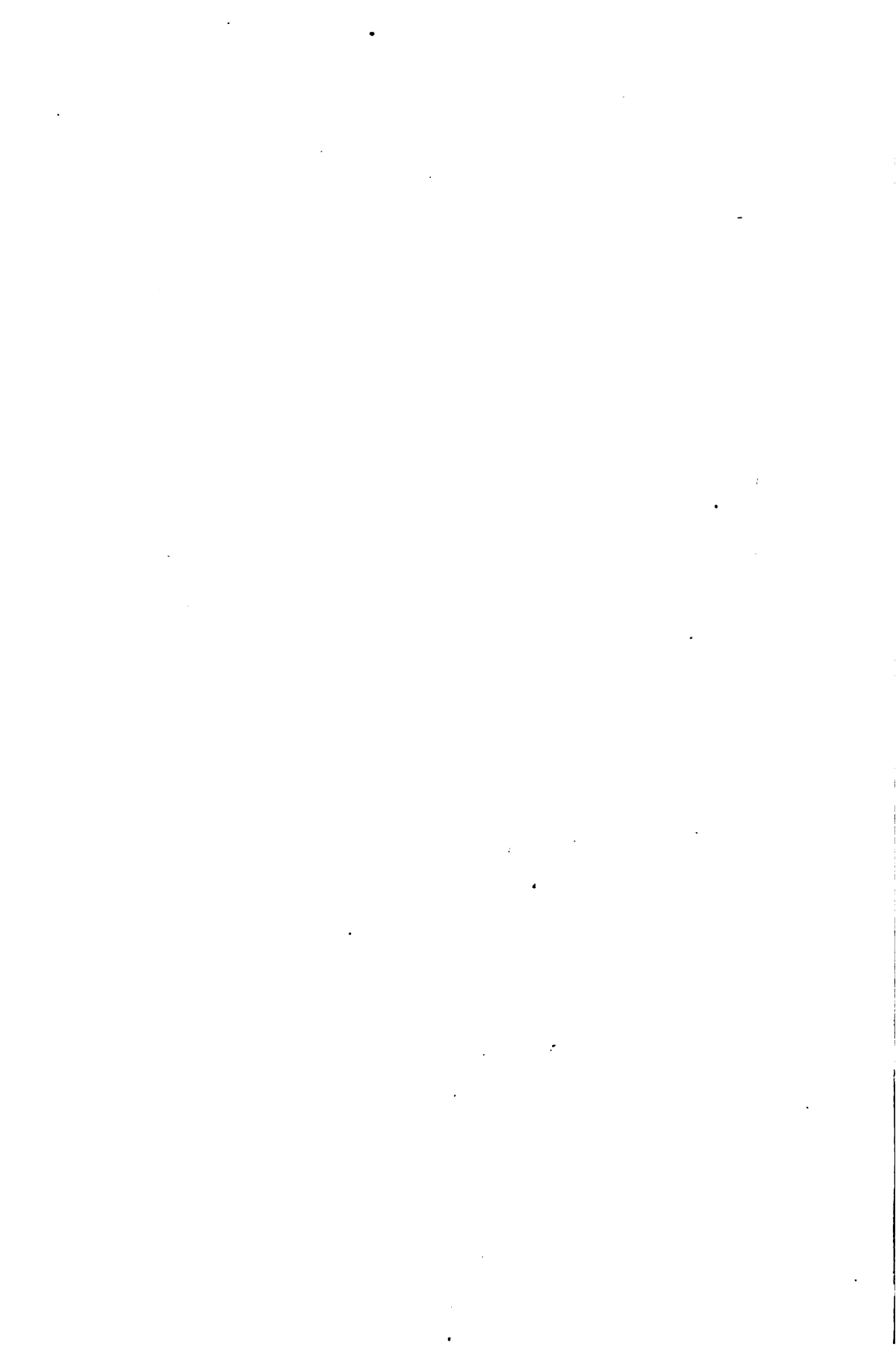
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THE  
RAILWAYS TERMINATING IN LONDON,

WITH A

Description of the Terminal Stations, and  
the Underground Railways.

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BY

SAMUEL REA,  
"

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# THE RAILWAYS TERMINATING IN LONDON,

WITH A DESCRIPTION OF THE TERMINAL STATIONS  
AND THE UNDERGROUND RAILWAYS.

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## INTRODUCTORY.

In the spring of 1887 the author had occasion to visit England, and being impressed with the great development of the railway system in the city of London, especially the terminal facilities and arrangements, he studied them on the ground, and he also examined into the financial condition of the representative railways of England; and the following pages are the result of his studies and observations.

The purpose of this review is to present a short account of the railways having their termini in London; an authentic statement of their mileage; their financial condition at the present time, with some reference to their history; the amount of their revenue as derived from passenger and freight traffic and from miscellaneous sources; the number of passengers conveyed annually by them; and the proportion per cent. of working expenditure to gross receipts. Also a description of the metropolitan terminal stations of these various railways, and a narrative, with a brief history, of the Metropolitan Railways, which are better known as the Underground Railways.

To make the subject clearly and easily understood, the very best maps obtainable for the purpose have been secured and made part of the review.

The first is an illustrated map of central London, extending from Hyde Park on the west, eastward to and including the Tower, and from Kennington Park on the south, to the northern limits of Regent's Park, and covers an area of about eighteen square miles of the most populous part of London. As the name implies, it is an illustration map of the subject in hand; and outside of the railways, with the terminal stations prominently shown in miniature, it is limited to the most important streets and buildings, the bridges crossing the Thames, and the old local names applied to certain parts or districts of London.

The second is a good railway map of London, showing the location of all the large railway termini, the Underground System, and the connecting roads; the Metropolitan lines and their direct connections (except the St. John's Wood line), being shown in red, and the trunk railroads in blue. "Trunk railroads" is used to distinguish those railways having large terminal stations in London and reaching well into the country, from the Underground System. This map covers about seventy square miles of London, including Richmond and part of Kew Gardens on the west, and points in the East End to a distance of two miles east of London Bridge.

The annexed tabular statements forming part of this review contain information on the exact status of each railway company, such as is hoped will be welcome to many close readers.

Statement A is a condensed financial statement of the various railways terminating in London, including in the operating returns only (and not in the capitalization), all the branch and auxiliary lines worked by them; also the Metropolitan and Metropolitan District Railways, which form the Underground System; their mileage, and their total capital paid up and raised by loans and debenture stock (funded debt), with their gross receipts, and whence derived, their working expenditure, and net receipts, and the proportion per cent. of working expenditure to gross receipts; and the subscriptions to joint lines and other companies. All of which has been carefully compiled from *Railway Returns* for England and Wales, Scotland and Ireland for the year 1886, and similar Statements B and C, for comparison, for the years 1883 and 1875 respectively.

In all these statements values have been reduced to dollars at the usual rate of five dollars equal to one pound.

Since writing this review the author has had the pleasure of reading Volume 81, Proceedings of the Institution of Civil Engineers for 1885, which contains papers by two distinguished members of that society—Benjamin Baker and John Wolfe Barry—on the “Metropolitan, and Metropolitan District Railways,” and the “City Lines and Extensions (‘Inner Circle’ Completion) of the Metropolitan District Railway” respectively. These papers, by engineers who were connected with the building of these railways, are replete with information concerning the location and details of construction of these lines, and are recommended to those who desire to be better informed on the subject.

## SOME GENERAL STATISTICS AND COMPARISONS.

No more interesting or entertaining subject can be taken up by an engineer visiting London, than the study of the railway system peculiar to that city. It furnishes more instructive professional information than can be found within the same limits in any other part of the world. Though appearing vast and complex at first, the subject after some study soon becomes simple enough, and the knowledge gained thereby is well worth the labor expended.

The railway system of the United Kingdom in the last thirty-four years has increased in mileage from eight thousand and fifty-three miles in 1854, to nineteen thousand three hundred and thirty-two in 1886.

The paid-up capital, during the same time, has increased regularly until in 1886 it amounted to \$4,141,721,270, or an average of \$214,240 per mile of line open.

The total gross receipts from all sources in the same year amounted to \$347,959,765, and the rate of earnings were \$18,000 per mile of line open.

The total number of passengers conveyed has been uniformly greater each succeeding year; the total number conveyed in 1854 was 111,180,165 against 725,584,390 in 1886.

The following table from the *Railway News* of London in 1887, covering seven years, shows the total number (exclusive of season ticket holders), and the increase and decrease, of the different classes of passengers conveyed.

"In the number of passengers carried, there has been a steady increase, although the first and second class returns



have been steadily falling each year. The numbers under the various heads for the past seven years are given below:—

	Passengers.	First.	Second.	Third.	Season.
1886 .	725,584,000	32,331,000	60,686,000	632,567,000	1,104,666
1885 .	697,213,000	32,465,000	60,986,000	603,762,000	924,542
1884 .	694,992,000	34,583,000	62,265,000	598,144,000	766,691
1883 .	683,718,000	36,388,000	66,097,000	581,233,000	632,050
1882 .	654,838,000	37,204,000	65,695,000	551,938,000	599,568
1881 .	623,048,000	37,994,000	64,475,000	520,579,000	538,452
1880 .	603,885,000	38,768,000	65,035,000	500,082,000	502,174

“It will be seen that, whilst since 1880 the number of first class passengers has fallen by 6,437,000, or nearly twenty per cent., and the second by 4,349,000, or about seven per cent., the third class total has risen by 132,485,000, or twenty-six and one-half per cent.”

It is evident from these figures that an opinion sometimes expressed of the English railways, and particularly those having their termini in London, as having reached their maxima in number of passengers conveyed is erroneous.

In 1886 the passenger traffic furnished 43.46 per cent. of the gross receipts for the United Kingdom; the freight traffic 52.26 per cent.; leaving 4.28 per cent. derived from miscellaneous sources, including navigation, steamboats, &c.

The average proportion per cent. of working expenditure to gross receipts was 52 per cent., the same as in 1883; and the relative proportion of net receipts to paid-up capital was 3.99 per cent., or the lowest percentage since 1867, when the return was 3.91.

For the twelve railways terminating in London and treated in this review, including the largest railways of the United Kingdom, and the metropolitan local lines (which derive nearly all their earnings from passenger traffic), these percentages will be found to vary considerably for obvious reasons.

The following table shows the total number of passengers, exclusive of season and periodical traffic, of the three classes conveyed in 1886 by the trunk railways (including the North London Railway), with the percentages for the same. To which is added, the receipts from season, periodical, and



workmen's weekly tickets, which properly represent the returns from the established local traffic.

NAME OF COMPANY.	Passengers conveyed in 1886.	First Class.	Per cent.	Second Class.	Per cent.	Third Class.	Per cent.	Receipts for Season, Periodical and Workmen's Weekly Tickets.
Great Western . . . . .	51,130,079	1,556,370	3.0	5,667,635	11.1	43,906,074	85.9	\$428,020 00
London and North-Western . . . . .	55,118,511	2,066,297	3.7	3,506,354	6.3	49,545,860	90.0	783,075 00
Midland . . . . .	33,276,371	1,482,397	4.4	. . . . .	. . . . .	31,793,974	95.6	583,215 00
Great Northern . . . . .	26,216,958	852,392	3.3	1,379,566	5.2	23,985,000	91.5	493,875 00
North London . . . . .	29,244,233	668,779	2.3	1,357,691	4.6	27,217,763	93.1	286,490 00
Great Eastern . . . . .	69,376,311	1,852,416	2.7	5,916,886	8.5	61,607,009	88.8	852,865 00
South-Eastern . . . . .	26,821,445	1,192,661	4.5	2,926,150	10.9	22,702,634	84.6	735,570 00
London, Chatham and Dover . . . . .	27,796,712	1,968,796	7.1	3,004,632	10.8	22,823,284	82.1	434,160 00
London, Brighton and South Coast . . . . .	36,151,885	1,673,904	4.7	3,154,011	8.7	31,323,970	86.6	923,640 00
London and South-Western . . . . .	35,604,087	2,321,293	6.5	4,462,106	12.5	28,820,688	81.0	804,750 00

To show the enormous and steady increase in the number of passengers conveyed annually by the Trunk Railways

having their termini in London (including the North London Railway), the following table has been compiled. It covers the twenty years from 1865 to 1885 inclusive, and shows the number of passengers conveyed annually (exclusive of season and periodical traffic), every five years.

NAME OF COMPANY.	TOTAL NUMBER OF PASSENGERS CONVEYED, EXCLUSIVE OF SEASON AND PERIODICAL TRAFFIC.				
	1865.	1870.	1875.	1880.	1885.
Great Western . . . . .	17,516,833	23,778,661	36,024,592	44,417,812	50,002,722
London and North-Western . . . . .	23,711,000	30,340,610	44,828,933	48,299,213	54,849,030
Midland . . . . .	11,179,051	17,519,825	27,764,297	28,222,266	32,246,548
Great Northern . . . . .	6,763,470	9,626,658	17,680,563	21,147,267	25,400,234
North London . . . . .	9,172,319	20,263,565	20,877,500	28,390,078	29,165,335
Great Eastern . . . . .	12,878,345	13,572,076	34,569,804	49,812,024	66,978,367
South-Eastern . . . . .	16,141,838	19,212,717	23,364,862	25,851,917	25,978,581
London, Chatham and Dover . . . . .	9,241,966	15,378,436	20,633,600	28,800,188	27,745,083
London, Brighton and South Coast . . . . .	14,660,873	19,350,443	25,411,786	36,042,437	34,767,250
London and South-Western . . . . .	10,598,243	13,387,357	20,998,310	30,294,406	34,591,779

For the purpose of showing how the total mileage of the railways terminating in London is made up, the following

table is presented. It gives the length of lines open on December 31st. 1886, the number of miles of single, double, treble, and four or more lines, on each of the railways.

NAME OF COMPANY.	MILEAGE OF LINES OPEN DECEMBER 31st, 1886.				
	Single Lines.	Double Lines.	Three Lines.	Four Lines or More.	Total.
Great Western . . . . .	1,267	1,137	. .	23	2,427
London and North-Western . . . .	393	1,281	29	131	1,834
Midland . . . . .	388	914	23	78	1,403
Great Northern . . . . .	184	553	29	30	796
North London . . . . .	. .	7	. .	5	12
Great Eastern . . . . .	481	554	3	7	1,045
South-Eastern . . . . .	45	318	3	3	369
London, Chatham and Dover . . .	11	165	1	7	184
London, Brighton and South Coast .	130	271	8	10	419
London and South-Western . . . . .	228	543	4	14	789

There are thirteen terminal stations encircling central London, eleven of which belong to the nine trunk railways terminating there, and two to local lines. Attached to these various trunk road termini are ten large modern hotels, the London and South-Western being the only one without this convenience. The following statement gives the names of all the large terminal stations of London, their location, the railway companies owning and using them, and the names of the hotels attached to the stations.

Name of Terminal Station.	Location.	Name of Railway Company.	Name of Hotels attached to Terminal Stations.	Remarks.
Paddington . . .	Praed Street, Paddington . .	Great Western . . . . .	Great Western Royal.	
Euston . . . . .	Euston Square . . . . .	London and N.-W. . . . .	Euston . . . . .	
St. Pancras . . .	Euston Road . . . . .	Midland . . . . .	Midland Grand . . .	
King's Cross . . .	" . . . . .	Great Northern . . . . .	Great Northern . . .	
Broad Street . . .	Liverpool Street, City . . .	North London . . . . .	. . . . .	Local Railway.
Liverpool Street .	Liverpool Street, City . . .	Great Eastern . . . . .	Great Eastern.	
Fenchurch Street .	Fenchurch " " . . . . .			
Cannon Street . .	Cannon " " . . . . .	South-Eastern . . . . .	Cannon Street . . .	City Station.
Charing Cross . . .	Strand, West End . . . . .	" . . . . .	Charing Cross . . .	West End Station.
Holborn Viaduct .	Holborn Viaduct . . . . .	London, C. and D. . . . .	Holborn Viaduct . .	City Station.
Victoria . . . . .	Victoria Street, West End .	L., C. & D. and L., B. & S. C.	Grosvenor . . . . .	West End terminus.
	(Local trains of the Great Western, and the Great Northern Railways run to and from this station.)			
London Bridge . .	Surrey Side, . . . . .	London, B. and S. C. . . . .	Terminus . . . . .	City Station.
Waterloo Bridge .	" " . . . . .	London and S.-W. . . . .	. . . . .	

Since there are but two prominent stations on the Surrey side of the Thames, London Bridge, belonging to the London, Brighton and South Coast Railway, and Waterloo Bridge, terminus of the London and South-Western, all the others lying on the north side and located around the "Inner Circle" of the Underground Railway, these two railways, with their stations, will be described first, and then crossing the Thames, the others will be taken up in regular order as we go around the "Inner Circle."

## SPECIAL DESCRIPTIONS OF THE RAILWAYS AND THEIR TERMINI.

The author presents in the following a description of—

1. The London, Brighton and South Coast Railway, and its London Bridge Station.
2. The London and South-Western Railway, and its Waterloo Bridge Station.
3. The Great Western Railway, and its Paddington Station.
4. The London and North-Western Railway, and its Euston Station.
5. The Midland Railway, and its St. Pancras Station.
6. The Great Northern Railway, and its King's Cross Station.
7. The North London Railway, and its Broad Street Station.
8. The Great Eastern Railway, and its Liverpool Street, and Fenchurch Street Stations.
9. The South-Eastern Railway, and its Charing Cross, and Cannon Street Stations.
10. The London, Chatham and Dover Railway, and its St. Paul's, Ludgate Hill, Holborn Viaduct, and the Victoria Stations.
11. The Underground Railway System, composed of the Metropolitan Railway, the Metropolitan District Railway, and a number of other lines forming part of the system, with connections to the trunk roads.

### I.

#### LONDON, BRIGHTON AND SOUTH COAST RAILWAY.

The London, Brighton and South Coast Railway, is an important line for points on the south coast of England be-

tween the Isle of Wight and Hastings. It maintains a daily express service between London and Newhaven in connection with boats running to Dieppe and Honfleur in France, the shortest and cheapest route to Paris. It has three terminal stations in London; London Bridge for the "City," with Victoria and Kensington in the West End. It also has a connection with the east end of London, and the Underground System via New Cross and Aldgate East. Through trains start from both Victoria (with connections from Kensington) and London Bridge Stations, and proceed to Croyden separately, where they are consolidated, and continue as one train. A description of Victoria Station will be found under the London, Chatham and Dover Railway.

The receipts of the London, Brighton and South Coast Railway from season, periodical, and workmen's weekly tickets, are larger than those of any other railway company in London. In the period from 1883 to 1886 this company increased its capital over \$1,000,000, but suffered a loss of 5,144,122 in the number of passengers conveyed, or an average loss per annum of 1,719,707. It, however, maintained its dividends ranging from four and one-quarter to six per cent. per annum on its ordinary stock, amounting to about \$36,000,000, and returned an increase in its net receipts in 1886 of \$300,000 more than 1883.

This is almost wholly accounted for in a reduction of operating expenses from fifty-one per cent. in 1883 to forty-eight per cent. in 1886. The decrease in passengers conveyed is doubtless due to the fact that this company surrendered the East London line some time during that period, to a joint committee of companies, by whom it is now operated.

#### *London Bridge Station.*

This station, as elsewhere noted, is on the Surrey side of the Thames, due south of the Monument, and close to London Bridge. It is one of the oldest of the metropolitan terminal stations, but less important (particularly for through travel) since the erection of later stations in the "City" and West End.

The London Bridge Station is divided in two parts; the north side, a through and local station of the South-Eastern Railway, and the south, or main part, the "City" terminus of the London, Brighton and South Coast Railway. The main station is upwards of seven hundred feet in length, and a portion of it is built on a curve. The roof is in short spans, supported on iron columns connected on top with plate girders.

There is a very large local business done at this station; the sheds cover thirteen tracks, and a part of the station is the so-called Terminus Hotel. Many trains at short intervals run between it and Victoria Station, over the South London line via Denmark Hill, occupying about half an hour on the trip. Besides, London Bridge being a through station on the South-Eastern Railway, quick trains run between it and the "City," and West End, every eight minutes, from six o'clock in the morning till midnight.

## 2.

## LONDON AND SOUTH-WESTERN RAILWAY.

The London and South-Western Railway, originally the London and Southampton Railway, which was organized in 1831, and completed in 1840, terminates on the Surrey side of London at Waterloo Bridge Station, and is the only trunk road having no station north of the Thames. The need of an independent terminus on that side is evidently felt, for it is understood that a site has been selected near South Kensington Museum for a West End Station, which would be reached from their own line over the tracks of the District Railway. The first terminus in London, and until Waterloo was opened in 1848, was at Nine Elms, about one and one-half miles south-west of Waterloo. The locomotive and car-shops of the company, and its principal freight station, are now located at this point.

The lines of this company run to the south-west of England, reaching all points on the English Channel from Portsmouth to Plymouth. At Southampton it connects with the North German Lloyd line of steamers plying between Bremen and New York, the Royal Mail to the West Indies, and



the Union Company's line to the Cape of Good Hope, and runs special through trains to and from London for their accommodation.

At Waterloo Junction Station, on the South-Eastern Railway, adjoining Waterloo Bridge Station, trains can be had every few minutes for Charing Cross, Cannon Street, and London Bridge Stations.

Between Queen's Road and Clapham Junction Stations there is a labyrinth of railways. It is said that more trains pass this latter station daily on the various lines of railway than at any other junction in the world. More than twelve hundred trains pass this junction every twenty-four hours; one thousand of these being signaled between 7 A. M. and 10 P. M., or one thousand trains in nine hundred minutes, an average of one train every fifty-four seconds during fifteen hours.

Connecting railways extend from Clapham Junction via Addison Road, Kensington, to Willesden Junction on the London and North-Western Railway, forming a most important link, which is operated jointly by the Great Western and London and North-Western Railways. The London, Brighton and South Coast and South-Western Railways also run over it to Addison Road. By means of this line, the South London line and connections, and that portion of the "Outer Circle" from Willesden Junction to Broad Street Station, the London and South-Western Railway is connected with the entire railway system of London.

#### *Waterloo Bridge Station.*

Waterloo Bridge Station is a quarter of a mile south of the Thames on Waterloo Road, and is approached by the South-Western Railway on a long brick viaduct, requiring the station to be on a high level.

To the casual observer, Waterloo Station having no imposing hotel to attract attention, appears less pretentious than any of the other termini. It is a stub, or end station, as are all the terminal stations of London, and is built on a curve. The interior is not prepossessing on account of its irregular and rambling appearance, and is divided into three parts. The

North Station is an addition, completed in 1885, containing six tracks, and is used by the local service running to points north of the main line from Clapham Junction, and for the milk traffic. The central portion is the old station, and is used by the main-line trains. It has nine tracks, with one extending through the station and across Waterloo Road to a connection with the South-Eastern Railway at Waterloo Junction Station, the two stations being connected by a platform. The South Station, opened in 1878, is used by the local and suburban trains, to and from points south of the main line. The suburban traffic on the lines of this railway has attained great proportions in recent years, and is constantly increasing.

Leaving Waterloo Station, we will now take up the rest of the railways and their termini, which, as hereinbefore stated, are located on the "Inner Circle."

Crossing the Thames on Charing Cross Railway Bridge, and taking the Underground at Charing Cross Station, we proceed to the terminus of the Great Western Railway.

## 3.

## GREAT WESTERN RAILWAY.

The lines of the Great Western Railway spread over the west of England and Wales, extending well out to the rocky promontory of Cornwall, from whence came the material used in the construction of the two most prominent bridges in London.

This great railway has grown from the line that was authorized in 1835 (five years after the opening of the first steam railway for carriages in England), to be constructed between London and the port of Bristol, one hundred and eighteen miles in length. It runs to Birkenhead on the Mersey, and before long will run directly into Liverpool, via the Mersey tunnel.

This company has the largest mileage of any railway in the United Kingdom, and controls more than forty different railways by lease or operating contracts; it has a capital of about \$400,000,000, and was operated in 1886 for forty-nine per cent. of its gross receipts.



As originally built by the younger Brunel, this railway had a seven feet gauge track, and up to 1885 it operated one hundred and eighty-three miles of line of that gauge, with two hundred and forty-three miles of mixed gauge.

Through trains run over these broad-gauge tracks on the trunk line of this railway, from London to Penzance, a distance of three hundred and twenty-eight miles.

The famous "Flying Dutchman" performs the journey from London to Exeter, a distance of one hundred and ninety-four miles, in four hours and fifteen minutes, including stops.

Connections at Westbourne Park with the "Middle Circle," and with the West London Line, put this railway in communication with the whole railway system of London.

### *Paddington Station.*

Paddington, terminus of the Great Western Railway, completed more than thirty years ago, is a low level station, with the Great Western Hotel fronting on Praed street for a head house. The departure side is on Eastbourne Terrace, and the arrival side on London street. The tracks in the station, of which there are ten, are about fifteen feet below the level of adjacent streets.

The sides of Eastbourne Terrace and London street, next the station, grade down to the level of the station platforms, and are covered with sheds. The trucks, cabs, and other vehicles, to and from the station, are required to enter from the east, and pass out at the west end of the covered way on departure side (south side), and *vice versa* on the arrival or north side. The direction of the street traffic, to and from the station, thus being divided, is made to conform to that of the railroad traffic.

This station is very commodious and admirably arranged; it probably illustrates better than any other station in London, the advantages of separating the traffic in and out of an important terminus. Its location was well adapted for this purpose, having three street fronts, and being depressed below their level, with Bishop's Road crossing overhead in its rear.

The train halls of Paddington are more than eight hundred feet in length, extending westward from the Great Western Hotel to, and connecting with Bishop's Road Station on the "Middle Circle" of the Underground Railway. They cover a greater area than those of any other station in London, and consist of three open spaces, with arched roofs connected and supported on columns; the central hall, with span of one hundred and twenty feet, contains six tracks, and the side halls, each with sixty feet span, contains two tracks. The whole is well lighted and ventilated. For shifting cars in the station, the capstan is used to good advantage; the same as is employed in the goods stations. At the rear of the train halls is a foot bridge, over the tracks, connecting the arrival and departure platforms, and also leading out to Bishop's Road Station.

The hotel is reached from the station by stairways, which lead up to a bridge built against the hotel, and running at right angles to the halls, whence an admirable view of the interior of the station, the platforms, cars, &c., can be obtained. This bridge, like the one in rear, connects the two sides of the station.

The connection made by the Great Western Railway with the Underground System enables it to run suburban trains over the Metropolitan Railways, and make convenient connections with all the other trunk roads. This railway also operates a local service between suburban points on its line, and Broad Street Station, terminus of the North London Railway, hereafter described.

There are many advantages in this division of traffic in large terminal stations which could well be adopted under same conditions in this country. The most prominent feature is, the absolute avoidance of the incoming passengers with their baggage, &c., colliding, or interfering with those preparing to depart, as occurs in so many of our large stations.

It is almost the universal practice now on the Continent to construct stations, where possible, for an absolute separation of traffic. As an instance, on the Stadtbahn of Berlin, (a magnificent modern four track elevated railway, seven miles in

length, completed in 1882, which traverses the city from east to west, five miles of which is carried on a handsome masonry viaduct), all the stations are constructed on this principle; the two most prominent types being the Friedrich Strasse, and the Alexander Platz Stations.

This is further illustrated in the new through station at Mayence, on the Rhine, where the termini have lately been removed to another part of the city, necessitating a tunnel under a portion of the fortifications to reach it. There, the station buildings are all on one side of the road, but the traffic is divided, and the passengers pass to and from the various platforms and station, by subways, under the tracks and platforms. The train hall of this station has a roof in one span, about one hundred and fifty feet in the clear.

All the latest and large passenger stations in Germany are arranged on this principle. Some on a magnificent scale, as in Hanover, Magdeburg, and other German cities.

## 4

## LONDON AND NORTH-WESTERN RAILWAY.

The London and North-Western after the Great Western Railway operates more miles of line than any other railway in the United Kingdom, and has the largest capital of any railway company in the world.

Its total capital, paid up, and raised by loans and debenture stock, amounts to more than \$500,000,000; or, two and seven-tenth times that of the Pennsylvania Railroad Company. Its ordinary stock in 1883 amounted to \$178,406,940, and paid seven and one-half per cent. dividends. In 1886, three years later, this had been increased to \$188,794,350 (or as much as the entire stock and bonded debt of the Pennsylvania Railroad Company), and paid six and one-quarter per cent. dividend; its guaranteed stock, and preferential shares, aggregating \$190,905,130, pay each four per cent. per annum, and its debenture stock (funded debt), amounting to \$128,223,265, pays four per cent. interest. Its loans only amount to \$875,865, and represent "Capitalized value of Land Rent

Charges." Its subscriptions in 1886 to joint lines, (including about \$10,000,000 of converted debentures of other companies) amounted to \$25,249,500.

This may be a surprising statement but is nevertheless true, as any one can verify by an examination of the official railway returns for England, as published annually.

In 1886 this company returned its total mileage at eighteen hundred and thirty-four miles, comprising three hundred and ninety-three miles of single, twelve hundred and eighty-one of double, twenty-nine of treble, and one hundred and thirty-one miles of quadruple or more lines.

Connection is made by this railway with the "Outer Circle" of the Metropolitan Railways and the West London line at Willesden Junction, a prominent junction point and transfer station on the outskirts of London, where all trains stop (with one or two exceptions). By this means, and by additional train facilities extending around to Victoria and other terminal stations, it is brought into communication with all the other trunk and local railroads.

It also maintains a local service between points on its own lines, via the junction just mentioned, and the Broad Street Station, terminus of the North London Railway. There are some fifty trains each way every week-day employed in such service.

Of the four railways running between London and Liverpool, this one is the shortest.

#### *Euston Station.*

Euston Station, terminus of the London and North-Western Railway, is in the north-western section of the city, and stands about one-eighth of a mile back from the "Inner Circle" of the Underground Railway. It has a commanding appearance as approached from Euston Square. A bronze statue of Robert Stephenson, the illustrious English engineer, is in front of the station in Euston Square. Leaving the square and going northward a short distance you pass under the Euston Hotel (recently consolidated with the Victoria), belonging to the Railway company, and into the main entrance to the

station, which fronts on Drummond street, thence into the general waiting-room, which contains a large statue in marble of George Stephenson, the famed father of the above-mentioned, and the perfecter of the locomotive.

The station is on a level with Drummond street, but the tracks beyond the station are depressed under the level of the streets. The arrival and departure platforms being separate, and spread out at the terminus, the station is located in the forks between them. It is the only one of its type in London. This plan for a stub, or end station does not commend itself as well as the arrangements at Paddington. The arrival platforms are on the east, and those for departure on the west side of the station.

The train sheds are low, supported on columns, and gabled lengthwise with the tracks, and lighted through ventilators in the roof. They are arranged in short spans, and are located on quite a sharp curve. The arrival side contains eight tracks, a cab drive, and a cab stand. The departure side proper, contains fifteen tracks, and in addition has a number of side tracks for storage of cars. There is a set of turntables placed in a diagonal line, cutting the tracks in the arrival side, and by means of these, with the aid of a strong horse, most of the shifting is done.

This company has some fine stations and terminal hotels on its line outside of London; notably, Liverpool, and Birmingham, which will compare very favorably with the stations of London.

## 5.

### MIDLAND RAILWAY.

The Midland Railway is the second great company of the United Kingdom in respect to total capital, and fourth as to mileage. It assumed its present corporate title in 1844, when a great number of small companies were merged and consolidated into one company. Prior to 1868 it had no line of its own into London, but depended on the London and North-Western, and the Great Northern Railways for the transportation of its traffic to and from the metropolis. The volume of the traffic

became so large, and was subject to so much delay, that the Midland Railway Company was compelled to construct its own line, which now terminates at St. Pancras station, London. The construction of this line of railway involved great engineering difficulties.

On its lines there are but two classes of cars—first and third—the second-class having been abolished fourteen years ago, at which time the rates were fixed at  $1\frac{1}{2}d.$  and  $1d.$  per mile respectively. This change, and other circumstances, has had the effect of gradually decreasing the first, and largely increasing the third-class travel.

In 1873, before the change was effected, it conveyed about 23,000,000 passengers, and in 1875, the first year after, about 27,750,000; in 1881 it conveyed 29,000,000—2,000,000 being first-class. This class of travel continues to decrease, and has fallen off to 1,500,000 in 1886, while the third class has increased to nearly 32,000,000. The total number of passengers conveyed in 1886 was 33,276,371, and the percentages for first and third were, 4.4 and 95.6 per cent. respectively.

In 1883 the passenger traffic furnished 30 per cent. of the gross receipts, while the freight, which is largely made up from the coal and iron industries, furnished 69 per cent.; leaving but 1 per cent. from miscellaneous sources; and in 1886 the percentages for these items were, 32.5, 66.4, and 1.1 per cent. respectively. In 1886 the net receipts of this company were, 4.26 per cent. of its total paid-up capital.

The company is in a healthy condition, and in 1883 paid  $5\frac{7}{8}$  per cent. on its ordinary stock, which amounted to \$132,140,395. This, however, has been increased to \$141,397,785 in 1886, and in consequence a reduction of dividend followed, the rate paid that year being  $4\frac{5}{8}$  per cent. Its subscriptions to joint lines and other companies, in the same year, amounted to \$35,991,935.

#### *St. Pancras Station.*

A short distance eastward from Euston Station and fronting on Euston Road, stands St. Pancras, the grand and stately terminus of the Midland.



St. Pancras is the latest metropolitan terminal station. It is a huge structure with an imposing façade, flanked at the eastern corner with a high clock-tower. It apparently dwarfs its neighbor *King's Cross* (Great Northern Terminus), giving the impression that it is several times larger, while in reality its covered area is about eighteen per cent. less, than that of the unpretending competitor. St. Pancras is a high level station, and is approached by the Midland Railway on an elevated way from beyond Regent's Canal. The St. Pancras Branch of the Midland Railway diverges north of Regent's Canal, and thence grading down, passes under that waterway through a tunnel, and continuing passes under a portion of St. Pancras Station to a connection with the Metropolitan Extension under Euston Road. Over this connection frequent trains run between Victoria Station, Pimlico, and local points on the Midland Railway, via Ludgate Hill and Farringdon Street Stations.

The station hall of St. Pancras is a mammoth structure with roof trusses of two hundred and forty-three feet span. The arched girders start at the street level, which is about fifteen feet below the level of tracks. The walls forming the sides of the hall are built up between the girders and are two hundred and forty-five feet apart. The floor of the station, which rests on longitudinal and cross-girders carried on columns, set on brick piers, forms the only lateral bracing for the immense arch above the foundation. The clear height above tracks is ninety-six feet, and the length of the hall is six hundred and ninety feet.

It is stated that the roof of this station is the largest in the world, and, including covering, two gables, and the necessary screens, cost \$347,000. The space underneath the train hall, which opens on the street level, was arranged purposely for storing and handling the Burton beer traffic, and is so utilized.

The departure platform is on the west side of the hall, also the booking offices, baggage and waiting rooms. Between the west side of the hall and the cab road there are nine tracks, and two more tracks between the cab road and the east side of the hall. The cabway is unusually wide, and extends throughout the length of the hall. The outer end descends under the track level and leads out to the streets below. The

interior of the hall has a pleasing effect, and presents decidedly the most imposing appearance of any of the large terminal stations.

The Midland Grand Hotel is on the corner of Euston Road and Skinner street, westerly side of station, and belongs to the railway company. The head house, a large and imposing building, connected with the hotel building, is used by the company for local offices.

## 6.

## GREAT NORTHERN.

This Railway runs almost due north from London to Doncaster, and together with the North-Eastern, and the North British Railways, form the well-known "East Coast Route" for York, and Newcastle, and thence to Edinburgh, Glasgow, and other points in Scotland, making connections over the shortened northern route, via the reconstructed Tay Bridge, completed in the summer of 1887 by the North British Railway Company. The "Flying Scotsman," one of the fastest trains in the world, runs over the "East Coast" route every week day. The Great Northern Railway reaches Liverpool via the Manchester, Sheffield and Lincolnshire Railway, and runs a "Dining Car Express" each way, once a day (Sundays excepted), occupying about six hours on the journey. It is a progressive road, running very fast trains, with good equipment, and more modern coaches than many of the other lines.

It has abolished second-class cars on such of its branch lines as are worked in connection with the Midland Railway, but still retains the three classes on its main line.

Like the Midland Railway, the Great Northern has an underground connection with the Metropolitan Extension before mentioned, and a similar service is maintained between local points on its line, and Victoria Station, and also between some connecting points on the London and South-Western Railway, via Ludgate Hill; and to Moorgate Street Station on the Metropolitan Railway. It also operates a local service between suburban points on its line and the Broad Street Station, terminus of the North London Railway.

*King's Cross Station.*

Across St. Pancras Road, and immediately east of the Midland Station, stands *King's Cross Station*, terminus of the Great Northern Railway. Detached from the station, and abutting on St. Pancras Road, is the Great Northern Hotel, owned by the Railway company and operated in its interest. It is an odd-shaped building, but apparently well lighted, and withal a comfortable-looking hotel.

King's Cross Station was evidently built for utility, for architecturally it is not striking. However, it was built many years ago and is still a well-adapted station. Three square towers form the façade, one at each corner, and the centre one rising higher than the other two displays the dials of a large clock. The station, as shown on the illustrated map, though quite small is a good likeness, as may be said of all the stations and miniature pictures shown on it.

The station proper is composed of two parallel halls, nine hundred feet in length, supported on three brick walls; the latter terminating in the towers just described, and the roofs extending out flush with the towers form two arches, one on either side of the central tower, having their ends enclosed with glass. The roofs are semicircular, and were originally of wood, but have recently been renewed with iron.

The central wall dividing the two train halls is an arcade with frequent openings. The west, or departure station, contains six tracks, and the arrival station five tracks, and they are used by through main line trains; the local service being conducted from an auxiliary building to the westward, and towards the rear of main line station.

King's Cross Station is on same level as Euston Road, and has an ample area in front for cabs and other vehicles.

Finsbury Park Station, opened in 1875 and located two and one-half miles north of King's Cross terminus, is a very important suburban station and junction point for this railway; about seven hundred trains traversing the tracks of the station daily. The station building is large and well adapted, containing fifteen waiting rooms, and extensive platforms.



### NORTH LONDON RAILWAY.

The North London Railway is a purely local line, with an extensive business. It is twelve miles in length, seven of which is double track, and the remaining five miles has four tracks. Its lines being mostly within the limits of the city, and a portion carried on an elevated way, necessitated great outlay in construction; it represents an average cost of about \$1,600,000 per mile of road.

For the past eight years this company has paid dividends on its ordinary stock at the rate of seven and one-half per cent. per annum, and accumulated a surplus in addition, amounting now to over \$100,000. This record as a dividend-payer is remarkable, and is not excelled by any other railway company in the United Kingdom.

This Railway, considering its mileage, conveys an enormous number of passengers; in 1886 it conveyed 29,244,233, exclusive of season and periodical travel, or nearly twice the number of all classes of passengers carried on the whole Philadelphia and Reading Railroad system in 1887, which comprises 1850 miles of railroad estimated as single track.

The North London Railway in connection with tracks of other lines forms the "Outer Circle" of the Underground system. Unlike the "Inner Circle" of that unique system, the "Outer Circle" stops at Broad Street Station, trains running thence back and forth from Mansion House every thirty minutes, and not continuously round and round. It also permits the running of local trains from suburban stations on the Great Northern, the London and North-Western, and the Great Western Railways, to and from its Broad Street terminus; which, together with its own trains, makes an enormous service in and out of that station.

#### *Broad Street Station.*

This is the metropolitan terminus of the North London Railway. It fronts on Liverpool Street, east of Finsbury Circus, not far from the Bank, and adjacent to the terminus of the

Great Eastern Railway. The interior arrangements are somewhat similar to its namesake of Philadelphia, namely:—It is a high level stub, or end station, with the offices, waiting rooms, &c., in the head house. There are two train halls, each ninety-five feet span and about five hundred feet in length. The roof trusses are arched, and rest on brick walls at their outer ends, and are supported on a longitudinal row of columns in the centre. The station contains seven tracks, and a large passenger business is conducted therein. About three hundred and sixty-five trains in each direction pass in and out of the station daily.

The Broad Street Station of the Pennsylvania Railroad in Philadelphia is also a high level stub, or end station, with offices, waiting rooms, restaurants, &c., in a head house; its train halls are about four hundred feet long, in two spans of eighty-five feet each, supported in like manner as in the London Broad Street Station, but containing one more track, or eight tracks in all.

Externally the stations are very unlike; the highly embellished Gothic architecture of the Philadelphia station eclipses the plain structure of the English namesake. Though Broad Street Station, Philadelphia, is much smaller than any of the London termini, it is worked to a greater capacity and with a higher efficiency proportionately. When it is known that thirty thousand passengers per day on the average pass through the Philadelphia station, small as it is comparatively, and that in addition, the enormous baggage, express, and package business that is transacted through it, the system in operation there will be appreciated.

## 8.

## GREAT EASTERN RAILWAY.

The Great Eastern Railway connects London with all points on the east coast of England, and interior places, between the river Thames on the south, and the Wash on the north. It also operates a line of steamers daily (Sundays excepted), from Harwich to Rotterdam, and Antwerp, for continental travel,

which is increasing every year. It transports more passengers annually than any other trunk road terminating in London, and about as many as the Metropolitan Railway.

In 1883 it conveyed 62,342,193 passengers, and in 1886, 69,376,311, or an increase of 7,034,118 in three years. The percentages of the three classes of passengers conveyed were, 2.7 for first, 8.5 for second, and 88.8 for third.

Prior to 1874 (the year Liverpool Street Station was completed), this railway terminated at Bishopsgate Street Station, about one-half mile north-east of the present terminus.

### *Liverpool Street Station.*

Liverpool Street is a low level station, with the tracks fully fifteen feet below the level of the streets, and about forty feet lower than the Broad Street Station, its near neighbor. It is connected by a subway with Bishopsgate Street Station on the "Inner Circle" of the Underground railway. Attached to this station is the Great Eastern Hotel, handsomely fitted up, and operated by the Railway Company. The tracks of the Great Eastern Railway approaching the station are depressed; as far out as Bishopsgate Station (low level) they are below the street level an average depth equal to that of the Underground Railway tracks.

There are four train halls in this terminus. The arched roofs rest on brick walls, and are intermediately supported on iron columns. The roof spans of two halls are each one hundred and nine feet, and the remaining two have each spans of forty-six feet. The main line part of station contains five tracks, and the suburban local part has six. The local and main line service is separated, the former is on the west side, and the latter on the east side of station, and a lattice overhead foot bridge connects the platforms of the two. Extensive improvements are now in progress on this station that will greatly increase its capacity.

This station is also used by the East London Line, which runs through the Thames tunnel to New Cross, and was until recently operated by the London, Brighton and South Coast Railway. This East London Line from New Cross now

has a direct connection with the "Inner Circle" of the Underground System, via Shadwell, St. Mary's, and Aldgate East, and doubtless much of its business which formerly went into Liverpool Street Station has been deflected to the new route.

The traffic returns of the East London Line have not been included in those of the Great Eastern Railway in the year 1883, but they have been included in the returns for the London, Brighton and South Coast Railway, which then operated it, and therefore, in no wise affects the above statement made in reference to the large passenger traffic of the Great Eastern Railway.

The East London Line, as elsewhere mentioned, is now operated by a joint committee; it is not profitable, and pays no dividends. Its capital is enormous, amounting to about \$19,000,000, or over \$2,700,000 per mile of its seven miles of line, six of which is double track and one mile single track. The large capitalization is explained by the great cost of the Thames tunnel, through which it runs. This tunnel was planned and built by the elder Brunel. On the Thames Embankment, near Waterloo Bridge, stands a statue to his memory erected by the city.

The tunnel was not successful financially for road traffic, for which it was constructed, and in 1865 was purchased by this Railway Company for \$1,000,000, or less than one-half its cost.

#### *Fenchurch Street Station.*

This is the smallest terminal station in London. It is situated a short distance northward from the Tower, and is used by the London and Blackwall Railway (leased to the Great Eastern), and the London, Tilbury and South End Railway, both local lines. The latter line has been extended sixteen miles since 1883, and is now sixty-one miles long, and double track, except four miles, which is single track. The total paid-up capital is \$11,286,340, and the dividend paid on its ordinary stock in 1886 was five and one-half per cent. The London, Tilbury and South End Railway reaches the Fenchurch Street terminus from Stepney Junction over the Lon-

don and Blackwall Railway, which approaches the station on a viaduct of considerable length.

Fenchurch Street Station is rectangular in shape and on a high level, with entrance through the head house, wherein are located the booking offices, restaurant, &c. Its architecture is very plain. There is but one train hall, with a flat arched roof, having a span of one hundred and twenty feet, supported on the main walls enclosing the station. The hall is about three hundred feet in length, but on the north, or departure side, the platform extends much beyond the covered portion. The hall accommodates five tracks.

The greater part of the eastern district of London, and all points on the north bank of the Thames below London, can be reached by the lines issuing from this station; also Greenwich, by ferry over the Thames from Millwall on the Isle of Dogs.

9.

#### SOUTH-EASTERN RAILWAY.

The South-Eastern is not a great railway in point of mileage, but is most certainly in modern city termini. It has but three hundred and sixty-nine miles of line (most of which is double track), extending from London to the south-east coast, and touching all prominent places from Margate to Hastings; also a branch line from Red Hill to Reading. Connecting with it, and owned by the South-Eastern Railway Company, are lines of steamers via Folkstone to Boulogne, Dover to Calais, and from Dover to Ostend, and special express trains run in connection with them.

It also controls the Greenwich Railway by lease, a line six miles long (from London to Greenwich), which is laid on a brick viaduct almost its entire length. The local passenger business of this railway is large and well-established, and particularly between Charing Cross and Cannon Street Stations. Upwards of four million passengers were carried the first year the Charing Cross railway was open for traffic.

The South-Eastern Railway completed the Charing Cross Railway in 1867. It extends from London Bridge Station to



Charing Cross Station, which is the West End terminus of the South-Eastern Railway. The Charing Cross Station fronts on the Strand just off Trafalgar Square. The City Extension of the Charing Cross Railway terminates in Cannon Street Station, within three hundred yards of the Bank of England, and is the so-called "City" terminus. The Charing Cross Railway and appurtenances, including bridges, lands, and buildings complete (according to the *Encyclopædia Britannica*), cost over \$15,000,000 or nearly \$3,500,000 per mile of the four and one-half miles of double-track railway constructed. The same authority states, that the first year this extension was opened for traffic about eight million passengers passed through Cannon Street Station.

The construction of this railway was a marvelous undertaking, and reflects great credit on the foresight and ability of the management of the company at that time, as well as on the engineers that built it. That a railway company with so little mileage behind it, having only two hundred and ninety-seven miles in 1865, should attempt a work of such magnitude, for passenger business only, and involving such an enormous outlay, and carry it out successfully, planting two immense terminal stations in the very midst of London, is truly wonderful.

This company proposes to carry out another bold undertaking, namely, the construction of a railway from near the old Bricklayers' Arms Station in Walworth (now used exclusively for freight), to a connection with its railway about midway between London Bridge and Waterloo Junction Stations. (Shown on map in dotted blue line.)

That it has repaid the company to construct the "City" terminus must be admitted after an examination into its growth and present condition, as appears in financial statements herewith presented.

#### *Charing Cross and Cannon Street Stations.*

These two termini of the South-Eastern Railway are typical central city stations. They are similarly constructed, and the internal arrangements are approximately the same.

Cannon Street, however, is the larger of the two, having fifty per cent. more covered area than Charing Cross, and a clear roof span of one hundred and eighty-seven feet over the tracks ; while Charing Cross is but one hundred and sixty-three feet. Both have large modern hotels attached to the station, which form the head house, with booking offices, &c., on the ground floor, and excellent hotel accommodations above. Notwithstanding the fact that these two stations were completed twenty years ago, they stand to-day, fit types of modern city terminal stations. Their architecture is imposing and well considered.

Since the two stations are so nearly alike, a brief description of Cannon Street will answer for both.

Fronting on Cannon street (which was opened in 1854) it stands back from that thoroughfare some ninety feet, leaving a broad area or forecourt in front of the station building for an entrance to the Underground Railway Station, a cab stand, and setting-down platform. This forecourt is partially enclosed with a heavy balustrade, and a fine approach at west side leads up to the hotel and station. The depth through the booking offices is about ninety feet, and the train hall, which extends to the bridge over the Thames, is over six hundred and fifty feet in length.

The station contains nine tracks, which at the outer end of train hall, converge into five tracks, that continue throughout the length of the bridge, a distance of about six hundred feet, thus utilizing the bridge for a station yard.

The bridge over the Thames is supported on deck girders in five spans, resting on concrete piers, enclosed in cast-iron cylinders. On the bridge is located the signal tower, and to illustrate the enormous traffic to and from the station, it may be mentioned, that thirty-five trains have been signaled, and passed in and out of the station in as many minutes. When it is considered that every train entering the station is reversed, and the engine changed, the above is a remarkable record.

It would be difficult to construct a more complete metropolitan terminus on the same area than the one at Cannon

Street. It is admirably located in that part of London known as the "City," and apparently embodies all the requisites of an improved city terminus. The same may also be said of Charing Cross Station in the West End.

Imagine an immense terminal station (much larger of necessity than Cannon Street Station) established on the line of Broadway or Sixth Avenue, New York, (which corresponds to Cannon Street or the Strand in London) and in the vicinity of Union or Madison Square; and imagine the railroads now terminating on the New Jersey side of the North River running directly into the same, then you can get an idea of what Cannon Street, and Charing Cross Stations, are to the city of London. Such a grand terminal station with a bridge over the North River would indeed be the gateway to New York. We say a bridge, because the underlying strata of the North River will not permit the construction of a tunnel on admissible gradients for heavy traffic, and for fast trains, which of course would be essential requisites.

That the needs of the South-Eastern Railway are constantly increasing is evidenced by the fact that the company has recently been compelled to widen the two bridges over the Thames, which form the approaches to Charing Cross and Cannon Street Stations. The bridge at Charing Cross, like the Cannon Street Bridge, rests on concrete piers enclosed in cast-iron cylinders. There are two footways for pedestrians (only one, however, is open to the public), and the footpath has been free from toll for about ten years. The bridge occupies the site of the old Hungerford Suspension Bridge.

#### 10.

#### LONDON, CHATHAM AND DOVER RAILWAY.

The main line of this company runs south-easterly after leaving London, and passes through Rochester, Chatham, and Canterbury, and thence to Dover, with branches to Gravesend, Queenboro', Ramsgate, and Deal, and also with a branch from Swanley to Ashford. It has the least mileage of any of the so-called trunk roads. It serves the same territory, though

not so extensively, as the South-Eastern Railway just described. The continental business of this railway, via Queen-boro' and Flushing, and Dover and Calais, is large; namely, more than fifty per cent. of the whole "Cross Channel" passenger traffic (which now amounts to upwards of 500,000 passengers annually) passes over its lines.

The company operates but one hundred and eighty-four miles of line, nearly all double track, and has a total paid-up capital of \$132,467,405, or about \$720,000 per mile of line. It is the only company, except the Metropolitan District Railway, herein described, that does not pay a dividend on its ordinary stock, which in 1886 amounted to \$56,288,910.

This company, unfortunately, was in the hands of incompetent financiers in the early years of its existence, who loaded it down with capital, for which there was no adequate representation. In "Railway Problems," J. S. Jeans, the prominent English statistician, says: "Out of the whole capital of the London, Chatham and Dover line in 1865, amounting to \$83,415,000, not less than \$20,545,000 was admitted to have been dissipated in obtaining the rest from the public, and \$9,740,000 more was disbursed out of capital for payment of interest and dividends." In view of this bit of history, it is not hard to understand why this railway alone, among the trunk roads of London, does not pay dividends on its ordinary stock.

In 1886 it conveyed 27,796,712 passengers, which was a decrease from 1883 of over 2,000,000. The percentages of the three classes of travel in 1886 were 7.08 for first, 10.81 for second, and 82.11 for third. The first-class travel showing a higher percentage than any of the trunk roads; which fact may be accounted for, in the greater proportion of wealthy passengers traveling to and from the continent.

This railway has many stations within the precincts of London. Approaching the city, the line forks at Herne Hill; the branch on the left going to Victoria Station in the West End, while the main line continues due north, on a long viaduct, through Camberwell New Road, Walworth Road, Elephant and Castle, Borough Road, and Blackfriar's, all important local stations south of the Thames. Thence it crosses the Thames

near the Blackfriars Bridge to St. Paul's, Ludgate Hill (both high level stations), and Holborn Viaduct Terminus.

From Ludgate Hill Station starts the Metropolitan Extension, a most important connecting railway. It diverges from the main line soon after crossing the girder bridge that spans that old thoroughfare Ludgate Hill, and grading down runs under Holborn Viaduct to Snow Hill Station, where it forks—the line to the east running under Smithfield Market to Aldersgate Station on the Metropolitan, and the line to the west into Farringdon Street Station on same railway, and thence through the "Widening" tunnel, crossing underneath the tracks of the Metropolitan Railway, to King's Cross and St. Pancras, where connections are made with the Great Northern and Midland Railways.

This extension is used at night for the delivery of coal from the Great Northern Railway to South London and Kent, and for goods traffic from the Midland Counties on its way to the Continent.

#### *St. Paul's Station.*

St. Paul's is a new station, completed within the last two years, more especially for local traffic, and in order to relieve Ludgate Hill, which did not admit of enlargement. It is located on Queen Victoria street, close to New Bridge street, and convenient to the Victoria Embankment, the fine boulevard along the Thames. The Blackfriars Station of the Underground Railway is located underneath the new station, which extends out on the new iron arch bridge over the Thames, built alongside the old through iron lattice bridge of the main line, a very inharmonious construction architecturally considered. It is a neat and convenient station, and is much used for Continental travel from the "City," as all through trains stop there *en route* from Holborn Viaduct Terminus.

#### *Ludgate Hill Station.*

Ludgate Hill is a through station, not more than one hundred yards north of St. Paul's Station. It is ugly in appearance. The tracks are enclosed between two parallel walls, about three hundred and fifty feet in length, with a wooden

roof, intermediately supported, covering the platforms and four main tracks. It accommodates a large local and suburban traffic.

*Holborn Viaduct Terminus.*

This is the smallest terminal station of any of the trunk lines. It fronts on Holborn Viaduct, is on the same level with that thoroughfare, and the Holborn Viaduct Hotel forms the head house. The train hall is about three hundred feet long, covering six tracks and the platforms, built on a slight curve.

The Holborn Viaduct Hotel presents a neat and inviting appearance on Holborn Viaduct, and just around the corner, on Old Bailey, stands the once famous Newgate Prison. The hotel is owned by the Railway Company, but managed by the well known firm of Spiers & Pond, whose name appears on many railway restaurants in England.

*Victoria Station, Pimlico.*

This is the West End terminus of the London, Chatham and Dover, and the London, Brighton and South Coast Railways; used also by the London and Northwestern, and the Great Western Railways for local service over the West London Extension.

The train service over the Metropolitan Extension of the London, Chatham and Dover Railway also starts here, running back and forth, via Brixton and Ludgate Hill, to Aldersgate Street, Farringdon Street, and King's Cross Stations on the Metropolitan Railway, and to local points on the Midland and Great Northern Railways.

The station is reached from the Surrey side by the several railways using it, via the Victoria Station and Pimlico Railway. The latter railway is very prosperous; it has a total paid-up capital of \$2,436,610, and pays a dividend of nine per cent. per annum on its ordinary stock, which amounts to \$1,125,000, four and one-half per cent. on its preferential, and the same rate of interest on its debenture stock.

Victoria Station is located in the most aristocratic part of London. It is within five hundred yards of Buckingham Palace, and not very distant from Westminster and the Houses of

Parliament. The Grosvenor Hotel, an imposing modern building, standing on the corner of Victoria Street and Buckingham Palace Road, forms the west side of the station.

The eastern portion of the station has two train sheds each about one hundred and forty feet span, with the outer end not completed. The entrance is from Wilton Road. This portion of the station is the West End terminus of the London, Chatham and Dover Railway, and contains ten tracks. It is also used for the local service of the Great Northern, Midland, and Great Western Railways. The macadamized cab road running throughout its length is fully seven hundred feet long.

The western side of Victoria Station is used by the London, Brighton and South Coast Railway as a West End terminus, and for the local service of the London and North-Western Railway, and contains nine tracks.

The local traffic, for which there is a large and varied service from Victoria Station, is separated from the through traffic.

A subway connects this station with the Victoria Station on the "Inner Circle."

In the London, Chatham and Dover Station there is a radial shifting table for engines and cars, connected with three tracks, which is quite simple. This arrangement could be utilized to good advantage in other similar stations.

## II.

### THE UNDERGROUND RAILWAY SYSTEM.

The Underground Railway System of London, as it is termed, is made up of the lines of the Metropolitan, and Metropolitan District Railways, their various branches and extensions, and such other connecting railways as are operated in connection with them.

The local names used in London for the Underground Railway System are a source of much confusion to the stranger in the beginning. The designations used are the "Inner Circle," the "Middle Circle," and the "Outer Circle."

Looking at the annexed railway map the reader will be able to understand the scope of the local terms from the following descriptions:—

“If a rough pencil line were drawn on a map of London, north of the Thames, from Aldgate to Westminster Bridge, then slightly southward to Victoria, westward to Gloucester Road, northward to Notting Hill Gate, north-eastward to King's Cross, and then back to Aldgate by way of Farringdon Street, the piece of the great metropolis enclosed within this rough circle would include a big slice of the city proper, Bloomsbury, Soho, the Charing Cross district, St. James's, Mayfair, a part of Westminster, Belgravia, a part of Brompton, the Green, St. James's, and Hyde Park, a part of Bayswater, a part of Marylebone, and a part of the King's Cross district. The whole of this line is the ‘Inner Circle.’ If from the westward end of this circle a sweep of the pencil be made, taking in a further slice of West London, the portion enclosed—added to all that has just been mentioned—forms the ‘Middle Circle.’ Then, if from the westernmost limit of this enclosure the line be carried north-west to Willesden Junction, then northeast to Hampstead Heath and Gospel Oak, and then southwards to Camden Town, easterly and north-easterly to Barnsbury, Islington, and Dalston, and southwards to Broad street, within a few yards of the Bishopsgate Station of the ‘Inner Circle,’ the stretch of London enclosed, added to the districts encompassed by the “Circles” already mentioned, constitute the whole area comprised within the ‘Outer Circle.’”\*

The intra-metropolitan railways which now form the so-called “Inner Circle,” were the first ones built. They are all beneath the streets and buildings, and there are occasional openings for ventilation. This is not the case with the later branch lines and extensions of the Underground System outside the populous parts of the city. These later additions run mostly in open cuttings, and through short tunnels, and

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\* The description is taken from Francis George Heath's Pictorial Magazine.



in some instances on brick viaducts, as on the Fulham Extension.

This latter mode of construction was adopted there in view of proposed further extensions across the Thames at Putney Bridge, to connections with the London and South-Western Railway in the vicinity of Wimbledon and Kingston. This extension is now under construction and there is a prospect of it being completed late in 1888.

That part of the Underground System represented by the Metropolitan Railway in 1886 had twenty-four miles of line. Twenty-two miles being double track, and two miles having four tracks. It includes the northern half of the "Inner Circle," the St. John's Wood Branch to Harrow-on-the-Hill and Rickmansworth (which leaves the "Inner Circle" at Baker's street, Regent's Park), and the Hammersmith and City Junction Railway by joint operation with the Great Western Railway.

The Metropolitan Railway owns jointly with the Metropolitan District Railway, the "Inner Circle Completion," and the fork to St. Mary's, the latter having recently been opened for traffic.

That part of the Underground System represented by the Metropolitan District Railway, in the same year had eighteen miles of double, and one mile of single line, which includes the southern half of the "Inner Circle," from South Kensington to Mansion House, the Richmond, Ealing, and Fulham Extensions.

It owns jointly with the Metropolitan Railway, as mentioned before, the "Inner Circle Completion," and that portion of the "Inner Circle" from High Street, Kensington, to South Kensington, and controls the Hounslow and Metropolitan Railway under an operating contract.

It also owns the short link from St. Mary's to Whitechapel, in the East End.

The Hounslow and Metropolitan is not shown on the accompanying map much beyond Mill Hill Park, where it branches, and continues southwesterly to its terminus at Hounslow Barracks.

The returns for 1886 give the total capital of the Metro-

politan Railway at \$56,645,420 or about \$2,360,000 per mile of line, and the Metropolitan District as \$42,842,595, or \$2,250,000 per mile of line, the latter including the capital of its various extensions, as they were constituted separate undertakings.

The Metropolitan Railway has been a paying property for some years, but the Metropolitan District has never paid any dividend on its ordinary stock, and in 1883 was only able to pay four and one-fourth per cent. on its preferential shares which aggregate \$7,500,000 at par, and that bear five per cent. dividends, and in 1886 only two and one-fourth per cent. on the same.

In the past these two companies have been involved in almost constant litigation which has grown out of competition, and has cost large sums of money.

In the case of the District Railway, that could ill afford it, the expense for law and Parliamentary charges amounted to upwards of \$60,000 in 1886.

This, however, should now cease, as an Act of Parliament was passed in 1886 under which a permanent arbitrator has been appointed, with power to adjust all differences arising between the two companies.

On these railways, and particularly that portion called the "Inner Circle," the work of construction was enormously expensive; the heaviest work occurred at Campden Hill in the West End, and at Clerkenwell north of the "City." At the former the cuttings reach forty feet in depth, and there is a tunnel under the hill about twelve hundred feet in length, necessitating a grade of seventy-five feet per mile, which is the maximum grade employed on the "Inner Circle."

Through the high ground in Clerkenwell the cuttings reach a depth of thirty odd feet, and there is a tunnel over two thousand feet in length under Farringdon Road, where the rails are about sixty feet below the surface at highest point over the tunnel.

Parallel with, and crossing under this tunnel is another of more recent construction, about the same length, called the "Widening" tunnel, on the Metropolitan Extension of the London, Chatham and Dover Railway.



The maximum grade descending eastward towards Clerkenwell is one foot per hundred.

The portion of the "Inner Circle" from Paddington to Farringdon Street and Moorgate Street Stations, was the first constructed, and was built to accommodate the seven-foot gauge of the Great Western Railway, and the standard gauge of four feet eight and one-half inches.

The clearance in the tunnels and cuttings was for this reason fixed at twenty-eight and one-half feet laterally, and seventeen feet over rails, with an elliptical arch twenty-seven inches thick, springing from side walls four feet wide.

The remainder of the lines and subsequent extensions were built for the national gauge only, and were made with clearance of twenty-five feet wide and fifteen feet nine inches clear above the rails.

Where open cuttings are used the tracks are between heavy retaining walls, as the cost of property prohibits the maintenance of slopes.

Baker Street Station, and one or two others on the northern part of "Inner Circle" were the first stations constructed, and are wholly beneath the surface of the streets. They are the standard length of three hundred feet, with a flat brick arch of forty-five feet span extending over the tracks and platforms throughout the length of the station.

This plan for stations was abandoned partly on account of excessive cost, and on account of ventilation, and thereafter, where possible, the stations were built in open cuttings, and roofed with glass, having the ticket offices located on the street level.

The "Inner Circle" is thirteen miles in length, double track, except between King's Cross and Moorgate Street Stations, about two miles, where there are four tracks. It was completed in October, 1884, about a quarter of a century after the work was first begun, by the construction of a link of railway one and one-eighth miles in length, extending from Mansion House to Aldgate Street Station, at a cost of about \$2,250,000, or, at the rate of \$2,000,000 per mile of double track railway.

The average height of the rails on the "Inner Circle" underlying the Victoria Embankment, and through the low ground near Sloane Square and Victoria Station, is thirteen feet below high water of the Thames. On the northern part of "Inner Circle" they rise to sixty feet above same datum, making a difference of seventy-three feet in level.

The tide extends up the Thames as far as Teddington (seventy-two miles above its mouth, and fifteen miles above the "City"), where the first locks are located; the mean range at London Bridge being seventeen feet, and of the highest spring tides about twenty-two feet. From this it will be noted, that the rails on the southern section of the "Inner Circle" are, at certain stages of the tide, below water level of the Thames, and for the purpose of establishing thorough drainage between Kensington and Blackfriars, the District Company operates five pumping stations. It will be remembered, too, that this part of London is all built on made ground reclaimed from the Thames, making it very difficult to secure substantial foundations for the railway and works.

Many difficulties were encountered in the construction of the Underground Railways, such as the disturbance of, and damage to buildings, the partial destruction, diversion, and rebuilding of immense sewers, and the necessary deflection of gas and water mains; not to mention the trouble and expense of doing the excavation and masonry work in such contracted places, and keeping the streets, while being tunneled, open for traffic.

An examination at Sloane Square Station in the West End, will disclose the fact that an old sewer is carried overhead the District Railway in a large iron tube, supported on iron girders. Similar instances frequently occur throughout the length of the "Inner Circle."

The innumerable difficulties encountered in underground workings in any city, and particularly in London, would seem almost insurmountable. In constructing these railways, however, they were all overcome, and the work carried out successfully and with great precision. The underpinning of such structures as the Cannon Street Hotel, the King William

Statue, and many other similar ones, without any bad effects or settlement resulting therefrom, need only be mentioned to be appreciated.

On the subject of the Underground Railways the *Encyclopædia Britannica* says: "The 'Inner Circle' of railways, as now constructed, is the direct outcome of the recommendation of the Lords Committee of 1863, that they should abut upon, if they did not actually join nearly all the principal railway termini in the metropolis, completing the circle by a line on the north side of the Thames."

To an observer this recommendation would seem to have been carried out with remarkable completeness; yet the same authority, in another article states, "The railway system in and around London has suffered greatly in directness from the absence of a complete plan embracing proper connecting links between the lines of the several companies."

This latter statement doubtless refers to the inadequate and inefficient rail connections between the Northern and Southern lines.

It is true that most of the passenger traffic of London is from east to west, and *vice versa*, and is well provided for, but there is also a vast amount of travel between the lines north and south.

The fact that there is no good all-rail route north and south is not creditable to the rapid-transit system, nor to the trunk roads of London. Most of the travel between the northern and southern parts of the city is transported by omnibuses running between Charing Cross and Portland road (Metropolitan Railway), Euston, and King Cross, and those running from Victoria Station, and along Euston Road.

The local rail communication between the northern and southern sections of the city is also bad and deficient. A case in point, to illustrate this fact, is the communication between Victoria Station and King's Cross. The distance between these two points by cab route is less than three and one-half miles, and a hansom can make the trip in twenty-five minutes. The distance by Underground Railway (either via "City" or Kensington), is about six and one half miles, and the time

occupied in making the trip about thirty-five minutes. To go all rail one must travel in an absurdly roundabout way, crossing and recrossing the river Thames, covering almost nine miles of distance, and consuming from forty to seventy minutes of time, depending on the character of train taken.

The train service on the Metropolitan Railways is very good, and apparently adequate for the number of passengers transported. On the "Inner Circle" trains run at intervals of ten minutes, in both directions, from six in the morning, throughout the day; and at intervals of fifteen minutes from eight in the evening till midnight.

On the "Middle," and "Outer Circles," the Richmond, Ealing, and Hounslow Extension, trains run every half hour. To the East End, and New Cross, and to Putney Bridge, on Fulham Extension, every fifteen minutes.

This makes a service throughout the day, in both directions, on the lower part of the "Inner Circle," between Mansion House (Central City Station), and Brompton (Gloster Road Station), every three or four minutes. And on the upper part of "Inner Circle," between Baker Street and Aldgate Stations, every four or five minutes.

The time occupied in running the "Inner Circle," thirteen miles in length, including stops at twenty-seven stations, is about one hour.

The following tables give the number of passengers conveyed by the Metropolitan Railways in 1883 and 1886, the increase and decrease, and the receipts from season, periodical, and workmen's weekly tickets; also the classification of travel for 1886.

NAME.	Total number of passengers conveyed (exclusive of season and periodical traffic).		INCREASE.	Receipts from season, periodical, and workmen's weekly tickets.	
	1883.	1886.		1883. Dollars.	1886. Dollars.
Metropolitan Railway	65,423,092	70,694,228	8.06%	213,160	240,940
Metropolitan District Railway . . . . .	36,799,958	41,273,962	12.16%	160,060	169,540

NAME.	Total number of passengers conveyed (exclusive of season, and periodical traffic) during 1886.			Percentages of the three classes of passengers con- veyed in 1886.		
	1st class.	2d class.	3d class.	Per cent.	Per cent.	Per cent.
Metropolitan Railway*	3,061,242	8,603,046	59,029,940	4.33	12.17	83.50
Metropolitan District Railway* . . . . .	3,348,180	7,409,610	30,516,172	8.11	17.95	73.94

The wide difference, as shown in the above table, between the percentages of travel of the two Metropolitan lines is very singular, as the two lines carry apparently the same class of passengers.

It may be explained by the fact, that the great railways terminating on the north side of the "Inner Circle," all of which have low percentages for first-class travel, may deliver to the Metropolitan Railway such a volume of their preponderating third-class travel destined to the "City," and other points reached by the Metropolitan Railway, as to largely increase that class of travel on it over the first-class.

Then, the District Railway having a better route from the wealthy quarter in the West End to the "City," and having a greater pleasure traffic to and from the exhibitions in Kensington, the amusements at Albert Hall, and the theatres in the Strand, accounts for its high percentage of first-class.

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\* Does not include City Line Extensions that conveyed 1,283,789 passengers in 1886.

## COMPARISON OF LOCAL AND SUBURBAN TRAFFIC IN LONDON AND AMERICAN CITIES.

Both the Metropolitan Railways of the Underground System are almost exclusively local passenger lines ; why they are not used more extensively for interchange of freight between the trunk roads, particularly in the early morning hours, is difficult to understand without a full knowledge of the details of their operations.

The traffic returns of the trunk roads, all of which do a large passenger business, furnish a lesson which our railroad companies would do well to ponder over. For it is certain that the railway companies of London consider the passenger business, especially the suburban traffic, of great importance, and they manage to draw considerable profit therefrom.

This policy differs essentially from the policy of our railroads, who, as yet, have made no great efforts to develop to its fullest extent, local and suburban passenger travel. It is a notable fact that many of our railroad managers and superintendents are averse to encouraging this class of traffic. They add new trains to their local service grudgingly, and only after repeated petitionings by their patrons. As to Sunday trains, in many instances where they are badly needed, they refrain from running them at all until compelled by public clamor for country service, especially in the summer season. They rather frown on new enterprises that have in view the development of purely local passenger traffic.

To the author's own knowledge the opinion has been expressed by officers of trunk railroads in the United States, that, " the local passenger business don't pay, and they would be better off without it."



To all such officials and other interested parties the study of the returns for the railways having their termini in London should be convincing proof of the fallacy of such assertions. It may not pay unless properly developed and managed, but let the service be operated with the strictest economy, and with proper facilities, and it must prove as profitable in the United States as it does in England.

The local and suburban traffic on the railways of London is enormous, and that it has grown to its present proportions, and is constantly increasing, is largely due to the exertions of the railway companies themselves. It must pay them handsomely, else they would not be so eager to secure it by expending large sums of money on huge and costly terminal stations, or by offering such superior train facilities to attract it. The same result ought to be attained in the large cities of the United States, if the railroad companies would exert themselves, and take up the question in a broad and liberal way. Then adapt the train service to suit each case, keeping it slightly in advance rather than behind the demands of traffic, and have the patience to await the progress of development that will certainly follow.

"Let the country make the railroads, and the railroads will make the country" is an old quotation. Look along the lines of railroad having the best and most frequent service, and observe how development follows and the adjacent country builds up. The growth is gradual but substantial, and the business when once firmly established and economically handled, pays better proportionately than the long distance through travel, over which there is so much disagreement by the competing companies.

## COMPARISON OF THE CONSTRUCTION AND MANAGEMENT OF ENGLISH AND AMERICAN RAILROADS.

The foregoing descriptions and statements will help us to a comparison between the railways of London, and those in and about any of our large cities, and determine the relative merits of each.

It has frequently been asserted by those returning from a tour of England and the Continent, that our railways are superior to those of the United Kingdom and Europe, and with this bare assertion they dispose of the whole subject. This, viewed with the full light thrown upon them, does not accord with the facts. To a representative railroad official has but recently been attributed the remark, that "the railways of Europe are one hundred years behind those of the United States." Such judgment is either based on an overweening affection for our own country and its institutions, or on a superficial knowledge of the foreign railways and their organization. Sometimes the details of transportation, which are inconvenient or disagreeable to Americans, are the cause for the supposed inferiority of railways abroad. Though such details may differ materially from what we are accustomed to, yet they are apparently satisfactory to the foreigners or they would not adhere to them.

It is true that the foreign railways do not have a number of conveniences and comforts to the traveler to which he is accustomed in this country, and that they are slow in adopting them. At the same time they have some good features that should not be overlooked, and for which they should have due credit.

England has good and definite laws in reference to the formation of new railway companies which do not permit the issue of fictitious capital stock so often practiced in this country. Nor is paralleling of existing lines of railway permitted when a railroad is fully adequate for the business of the country through which it runs. The English government does not tolerate the suicidal rate-wars which so frequently prevail here to the detriment of investors and the public generally, and not infrequently bring ruin to the participating companies.

Block-signaling in running trains originated there and has been used for many years.

Railways and highways are not allowed to cross on the same level in cities, nor elsewhere if much traveled. Some of these excellent features are gradually being adopted by our more advanced companies, notably the block-signal system, and the avoidance of grade crossings in the cities and important towns of our States.

In the matter of city terminal stations, which are a conspicuous part of every railway, English roads are unsurpassed, and far in advance of our railroads. Other particulars of the foreign roads could be enumerated worthy of imitation.

The data herein presented will enable the reader to form for himself an intelligent and reliable opinion, based on facts compiled from the representative railways of England.

There likewise prevails in this country a wrong impression as to the returns made on capital invested in railway property in England. The magnificent stations, the permanent character of their railways and engineering works in England, may partially be explained by the fact that capital can be obtained more plentifully and at cheaper rates.

An examination of the financial condition of the railway companies herein described, will develop the fact, that whilst the capital invested in railway property in England, is enormous, it is justified, as the returns made on the investment prove. The debenture stock (or funded debt), which is about one-fourth the entire paid-up capital stock and debt of these companies, averages more than four per cent. per annum interest, which in this country has become a good rate on prime railroad bonds.

As to the dividends paid on ordinary stock, by referring to Statement A, we find, that the London and South-Western, the London and North-Western, the Great Western, the Midland, and the Great Eastern, five of the great railways of England,—together representing 54.8 per cent. of the total mileage, and 42.8 per cent. of the total ordinary stock capital of England and Wales,—averaged 5 per cent. dividends on their combined ordinary stock, during the year 1886.

English investors invariably prefer undertakings promising durability and permanence, at low rate of interest, and this explains, for instance, how ten million dollars could, with the greatest ease, be provided for the construction of the Forth Bridge, the largest bridge yet built, based on an amount of business which we would not think sufficient for the investment of one-third the sum. American investors have hesitated for a long time to encourage the building of a bridge over the North River to a terminal station in New York City, although this is an undertaking the favorable result of which can now be foreseen with almost absolute certainty.

But as the population and wealth of the United States are increasing, the rate of interest will decrease, and with the greater ease of obtaining capital at low rates, the time will come when the conditions for large enterprises will not only be equally favorable to those abroad, but will afford opportunities in this country for carrying out works in connection with railroads of unprecedented magnitude.

Fifty years ago, when the building of railways in England commenced, it was thought necessary to build them in a straight line, and for as nearly a level grade as was possible. Consequently many mistakes were made and enormous sums of money misspent. The Edinburgh and Glasgow Railway is known as an instance of this kind of early engineering.

There was business waiting for the English railroads in many instances before they were built, in others the railroads induced and created it, but in all cases the investors had unbounded faith in the final success of their enterprises, and constructed them accordingly, with a lavish outlay of money. Take for instance the Underground Railways in London.

They did not merely build them to accommodate the travel at the time they were projected, but apparently for all time. We have seen how they matured the plan a quarter of a century ago, thus solving the problem of rapid transit for the most populous part of London; and how Parliament stepped in and said how they should locate them so as to form the present completed "intramural circle," which is beyond question, considering the crooked streets and irregular surface, the best mode of rapid transit for London north of the Thames. And so it was with their grand terminal stations. Most of them were built many years ago, and were at that time larger than necessary, though at present they are not only not too large, but extensions and additions to them have become necessary. With such a standard of excellence before us, in the railways and aperturances of London, particularly in their ability to transport millions of passengers, we should not hesitate to imitate them in our large cities. Instead of waiting for the needs to press hard on us, as is now the case, for instance in New York, we should provide for the present and anticipate the future with liberal provision for the future growth, in the laying out of plans for local rapid transit, and for the entrance of the railways connecting with local lines. By elevating and depressing such portions as may be necessary, of existing lines of railways in many of our cities, and connecting them at suitable points, so as to form preferably circular, or circulating systems, a plan for rapid transit could be executed for a comparatively small outlay of capital. And since there is no one item which is so important, and which helps to build up a great city, as easy and rapid communication between all its parts, and with convenient facilities for reaching other cities, it would be well for those charged with the responsibility to set about establishing such a permanent system as may supply the wants of the future.

## A FEW SUGGESTIONS TO ENGLISH RAILWAY COMPANIES FOR PEACE AND PROFIT.

Competition between the trunk railway companies of England is quite as active in generating disputes and leading to the invasion of each other's territory as elsewhere.

The South-Eastern and the London, Brighton and South Coast Railways, which have been joint users under an agreement, of parts of each other's lines in and about London for more than forty years, are now engaged in warfare.

The demands of traffic long ago necessitated four lines of rails on that portion of the Brighton Company's property between Croyden and Corbett's Lane; of these four tracks the two centre ones are set apart for joint use of both companies, while the two outside tracks are used exclusively by the Brighton Company. This precludes the South-Eastern from any share in the local business, which the Brighton company claim they never had any right to enjoy under the agreement.

Lengthy and voluminous communications looking to arbitration have passed between the two companies, but they have so far been unable to settle the trouble. The South-Eastern wants to share the Brighton's local business, and perhaps get an entrance into the Crystal Palace; and the Brighton company would like very much to run its trains into the Charing Cross, and Cannon street stations of the South-Eastern. On the other hand, the London, Chatham and Dover Railway runs also through a portion of the same territory traversed by the railways of the companies just mentioned, and controls fully one-half of the "Cross Channel" passenger traffic, about which it and the South-Eastern are now having a lively dispute.

Pools and agreements are apparently no more effective in permanently settling competitive traffic questions in England than they have proved in the United States, for they have tried arrangements that are similar, and have failed in same manner as in the United States.

The London, Chatham and Dover is charged by the South-Eastern with violating the spirit of the "Continental Agreement" entered into by them more than twenty years ago, for the pooling of the "Cross Channel" traffic.

The London, Chatham and Dover Railway some years ago established a new Channel service between Queenboro' and Flushing, just outside the geographical limits of the agreement, and the South-Eastern have been withholding moneys due them under the agreement pending a settlement.

The matter has now been referred to the House of Lords to test the validity of the agreement.

The character of the business of these three companies is so similar, and much of the territory traversed by them the same, that it would seem proper, and certainly prove mutually beneficial for them to enter into an arrangement (if possible under their laws), by which they would be placed under a single management. This would materially reduce expenses, and the distribution of the net receipts could be *prorated*.

Such a consolidation would not form a very large system, as their total mileage would aggregate less than one thousand miles, and their combined capital would be considerably less than that of the Midland Railway.

The business and traffic of the Metropolitan and Metropolitan District Railways are so closely interwoven as to make them almost inseparable; and yet in their dealings with each other they are wide apart, and have been at variance for years.

The financial condition of the District Railway is not sound, and the reports show that it is retrograding; the returns for 1887 falling behind those of 1886, which were far from satisfactory.

The same suggestion just made, as a solution of the difficulties existing between the Southern Lines engaged in competitive business, may be aptly applied to these intra-met-



ropolitan railways. Consolidate them under one management so far as their operations are concerned, with a joint board of control, and, if advisable, reduce the service at certain times in the day, which would seem possible with the present traffic, particularly on the southern half of the "Inner Circle" during the mid-day hours; and with other economies lower the working expenditures to a minimum. Then divide the net receipts between the two companies on an agreed basis. Otherwise, the stronger company will survive, and the other one will eventually be forced into the hands of a receiver.



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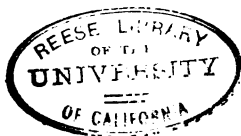
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